UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

ANNUAL FOREST INSECT STATUS REPORT
IDAHO AND MONTANA
1939

By James C. Evenden
Senior Entomologist
Division of Forest Insect Investigations

INTRODUCTION

The prevention of excessive losses of commercial and scenic timber resulting from the attacks of forest insects is a major problem of forest protection and management. To achieve this objective information must be made available which will permit the direction of artificial control against the early stages of potentially dangerous insect outbreaks. The annual reports from the ranger districts of the Forest Service and National Park Service constitute a valuable source of supply to this accumulation of insect status data. In some instances their importance would seem to have been underestimated, as the data submitted have not been complete or thorough. These reports fill a requirement in the regional program of forest protection which can not be supplanted by more intensive forest insect surveys, as it is obvious that the survey program can not include an annual coverage of all timbered areas. With the appreciation that at the present time these reports provide the only data available for many areas and that even under optimum conditions they will need serve between the periods of the more intensive surveys, it is believed that they can be made to be more valuable in the future.

It has been the practice of this laboratory to summarize all available information relative to forest insect conditions within the region, into an "Annual Forest Insect Status Report", which is made available to all agencies interested in the forest resources of the northern Rocky Mountains. A few changes have been made from the previous style of this report, as some tabulations have been omitted as conveying no essential information. Although this report contains some detailed information concerning the different infestations, questions concerning any of the situations discussed will be answered to the extent of the data available.

Of the great number of insects that feed upon the different portions of forest trees and shrubs, only a relatively few species are of primary importance. These few species can be grouped into the three rather broad classifications of bark beetles, defoliators, and insects which damage forest products. Bark beetles destroy trees by constructing galleries or feeding tunnels between the bark and wood. Defoliating insects feed upon the foliage of forest trees and shrubs. Such crude forest products as poles, logs, etc., that are left in the woods during summer months, are damaged by a number of different insects.

Bark beetles are the most destructive of all forest insects. In some timber stands there occur so-called normal infestations of these insects that destroy a small percent of the stand annually. With some tree species the annual loss from these normal infestations is quite severe, while in other forest types it is negligible. During conditions favorable to rapid increases in beetle populations, epidemics occur, and during these periods a large percent of the total volume of timber is often killed in a few years. The economic importance of this destruction of forest trees is reflected not only in the actual stumpage values of the trees killed but in the severe fire hazard that the dead trees create; the reduction of the merchantable volume to a point where the residual stand can not be profitably harvested; lessening of scenic values; and the change in stand compositions which occurs in temporary forest types.

During the past two decades the mountain pine beetle has been responsible for the destruction of approximately 40 percent of the merchantable lodgepole pine of Idaho and Montana. It takes an annual toll of many million board feet from the white pine forests of northern Idaho and western Montana. On the Coeur d'Alene National Forest, this loss as revealed by adequate surveys during the past ten years has amounted to 9,000,000 B. F. annually. Losses of even greater severity have occurred in other white pine areas.

The western pine beetle (Dendroctonus breviconis) and the Douglas fir beetle (Dendroctonus pseudotsugae) are responsible for heavy annual losses of ponderosa pine and Douglas fir. The annual loss of ponderosa pine is more than one third of the volume cut for lumber, while the annual loss of Douglas fir is nearly three times the amount.

During the past few years there have been some severe epidemics of the Engelmann spruce beetle within the commercial and scenic spruce stands of the region. During these outbreaks a large percent of the mature trees above 10 inches in diameter were killed.

SUMMARY TABULATIONS OF RANGER REPORTS
Forest Service Region 1

Forest insect infestations change from normal to epidemic conditions so quickly that serious situations often exist before the damage is realized. The responsibility of reporting all unusual insect situations or changes in existing conditions is one that rests upon the officers of all land-managing agencies. Past reports have not been without error; however, valuable information has been obtained, which has served as a basis for subsequent examinations and surveys and it is trusted that every effort will be made by the reporting officer to improve the quality of future records.

The following tabulation shows the number and character of the annual insect reports received from the forest rangers of Region 1:

NUMBER OF REPORTS RECEIVED
REGION 1 ONLY

	1937	1938	1939	
Number of forests reporting.....	16	17	16	
Number of ranger districts reporting.....	94	91	94	
Number of insect infestations reported.....	177	162	143	143
Number of reports depicting no infestations...	20	7	16	
Number of Dendroctonus reports.....	123	100	93	
Number of fir engraver beetle reports.....	7	1	1	
Number of spruce budworm reports.....	5	7	6	
Number of hemlock looper reports.....	17	26	12	
Number of larch sawfly reports.....	0	5	10	
Number of miscellaneous reports.....			21	143
Increasing infestations.....	31	42	15	
Decreasing infestations.....	47	49	43	
Normal infestations.....	51	53	66	
Infestations reported as no longer existing...	23	17	18	
Status of infestation unknown.....	0	1	1	143

REPORT OF MISCELLANEOUS SECONDARY INSECTS
(I-Increasing, D-Decreasing, N-Normal, S-Stopped)

	1939
Beaverhead National Forest	
The Western Balsam Bark Beetle (*Dryocoetes confusus* Sw.)	1-I
Bitterroot National Forest	
Ips sp. (Probably *Ips oregoni* Eichh.)	1-N
Douglas Fir Aphid	1-N
Cabinet National Forest	
Aphis (Lodgepole Pine)	1-I
Aphis (Ponderosa Pine)	1-I
Spider Mite (Cedar)	1-D
Larch Sawfly (*Lygaeonematus erichsonii* Hartig)	2-I
Custer National Forest	
Grasshoppers and Crickets	2-S
Tip Moth (*Rhyacionia* sp.)	2-D, 1-I, 1-S
Deerlodge National Forest	
Spruce Gall Aphis (*Adelges cooleyi* Gill.)	1-N
Flathead National Forest	
Alder Flea Beetle (*Altica bimarginata* Say.)	1-N
Spruce Gall Aphid (*Adelges cooleyi* Gill.)	1-N
Larch Sawfly (*Lygaeonematus erichsonii* Hartig.)	2-N, 1-D, 1-I

REPORT OF MISCELLANEOUS SECONDARY INSECTS (Cont.)

	1939
Kaniksu National Forest	
White Pine Moth (Possibly Neophasia menapia Felder)	1-N
Kootenai National Forest	
Larch Sawfly (Lygaeonematus erichsonii Hartig.)	2-N, 1-D, 1-S
Lolo National Forest	
Western Gall Fly	1-N
Nezperce National Forest	
Spruce Gall Aphid (Adelges cooleyi Gill.)	1-N
Pine Midge	
St. Joe National Forest	
Spruce Gall Aphid (Adelges cooleyi Gill.)	1-N

PRIMARY BARK BEETLE INFESTATIONS

Mountain Pine Beetle (Dendroctonus monticilae Hopk.) in Western White Pine

In 1907 Supervisor Skeels of the Coeur d'Alene National Forest reported that during the past ten years from 40 to 50 percent of the merchantable white pine of the forest had been killed by the mountain pine beetle. Although this figure may appear high, many areas show comparable reductions in the original white pine stocking of mature trees. With such severe losses existing on the Coeur d'Alene Forest, it can be safely assumed that similar conditions existed in other white pine areas. The many standing and fallen snags of trees killed by this insect remain in mute evidence of past losses.

An estimate of the volume of white pine that has been destroyed by the mountain pine beetle during any definite period would be rather impossible to make. It is sufficient to say that it has been tremendous, and that the potential volume of mature trees on all areas has been reduced by a large percent. In the younger white pine stands the past losses have been rather negligible, as such trees do not become susceptible to the attacks of this insect until they are from 100 to 120 years of age.

The first artificial control operation directed against an outbreak of the mountain pine beetle in white pine was instituted in 1913, when some 2,500 infested trees, located in three different areas on the Coeur d'Alene National Forest, were felled and peeled. Since that time projects have been directed against outbreaks of the mountain pine beetle on the Clearwater, Coeur d'Alene, Kaniksu, Kootenai and Cabinet National Forests, with serious infestations occurring in other areas where similar control projects should have been instituted.

A description of the present situation within the different white pine stands of the region follows:

Clearwater National Forest and Adjacent Private Lands

The mountain pine beetle infestation within the white pine stands of this area can be properly regarded as potentially dangerous and requiring careful attention if serious losses are to be prevented. This area was covered by a forest insect survey in 1938, with some areas being rechecked in 1939. The status of the infestation as revealed by this survey is shown in the following tabulation:

SUMMARY TABULATION OF THE 1938 INFESTATION
OF THE MOUNTAIN PINE BEETLE IN WHITE PINE

Unit	Acres	Trees per acre: New attacks	Trees per acre: Green	Percent of stand killed	Total number of infested trees
Clearwater National Forest					
Sheep Mountain	2,880	1.026	48.5	2.1	2,954*
Checked 1939		.295	-	-	850
Tepee Creek	1,280	.780	37.8	2.1	998*
Checked 1939		.193	-	-	247
Cedars	25,600	.224	16.3	1.37	5,734
Washington Creek	3,840	.202	26.3	.76	776
Dead Horse	1,280	.158	11.6	1.3	202
Orogrande	22,400	.089	32.8	.27	1,993
Canyon Creek	13,000	.067	18.2	.36	871
Skull Creek	6,400	.052	26.7	.20	333
Quartz Creek	9,600	.048	35.4	.13	461
Musselshell	32,000	.038	12.4	.3	1,216
	118,280				
Clearwater Timber Protective Association					
Tepee Creek	640	.57	34.2	1.7	365*
Checked 1939		.17	-	-	112
Washington Creek	20,000	.158	29.0	.54	3,160
Bertha Hill	43,500	.121	26.2	.46	5,263
Headquarters	46,000	.102	22.3	.46	4,692
Pierce	19,000	.077	21.0	.37	1,463
Orogrande	16,600	.032	22.3	.14	531
Musselshell	16,600	.013	10.7	.12	216
Whiskey Creek	8,300	.009	16.1	.05	75

* Treated spring 1939.

St. Joe National Forest and Adjacent Private Lands

The rangers' reports of the past season list a number of normal infestations of the mountain pine beetle, which are not considered as serious. There have been some severe losses in the mature white pine

stands which have subsided during the past few years. Data from the last survey of this area, which was made in 1937, are shown in the following tabulation:

SUMMARY TABULATION OF THE 1937 INFESTATION
OF THE MOUNTAIN PINE BEETLE IN WHITE PINE
St. Joe National Forest

Unit	Acres surveyed	WP green stand per acre	Infested trees per acre WP	Infested trees per acre LPP	Percent of WP stand infested	Total infested trees on unit WP	Total infested trees on unit LPP	Remarks
Clarkia	26,428	15.6	.080		.51	2,114		
Roundtop	13,747	7.0	.029		.41	399		
Fishhook	15,437	7.1	.005		.07	77		
Bear Skull	10,869	21.0	.044	.011	.21	478	120	
Hoodoo	11,879	13.5	.012		.09	142		
Turner Flats	21,700	21.3	.012		.06	260		
Gold Creek	15,560	19.5	.021	.028	.11	327	436	
Elk River	149,169	15.2	.028		.13	4,177		WP infestation 29% windfalls
Palouse	54,095	7.1	.016		.06	865		WP infestation 71% windfalls
	318,884	13.6	.028		.21	8,839	556	

Although the infestations listed are not serious, their potentials must be recognized and measures taken to prevent the occurrence of future outbreaks. To determine the status of the 1940 infestation this area will be included in the program of insect surveys to be executed by the Forest Insect Laboratory during the coming field season.

Coeur d'Alene National Forest

In 1930 control measures were directed against increasing infestations of the mountain pine beetle in practically all white pine stands of this forest. Approximately $141,000 were spent in treating some 23,000 infested trees. Since that time nearly $200,000, exclusive of CCC labor, have been spent in treating the "hot spots" of infestation that have occurred from time to time in the different areas of mature timber. Although difficult to determine the actual benefits derived from this operation, it is safe to assume that had no control been instituted a large percent of the merchantable timber would have been killed. Since the institution of this project in 1930 all white pine areas have been covered annually with an insect survey which shows that even with the benefits of maintenance control the loss has been severe. The data obtained from these survey projects show that during the period from 1929 to 1939 there have been nearly 200,000 mature white pine trees killed, making an annual loss of approximately 9,000 M.B.F. This loss has occurred as single trees or small groups distributed throughout the 118,000 acres of mature white pine type.

The character of the present infestation as indicated by the 1939 survey is shown in the following tabulation:

MOUNTAIN PINE BEETLE INFESTATION ON THE
COEUR D'ALENE FOREST 1938 AND 1939

Unit	Acres	Infested trees per acre 1937	Infested trees per acre 1938	Infested trees per acre 1939	Percent of stand killed 1938	Percent of stand killed 1939	Infested trees 1938	Infested trees 1939
Little River District								
Forks	1,100	.039	.021	.042	.71	.7	23	46
Tom Lavin	3,000	.020	.009	.071	.17	1.1	27	213
Iron Cr.	4,120	.041	.133	.047	.14	.7	548	194
Cathcart	3,200	.020	.074	.071	.96	.9	237	227
Cascade	3,640	.124	.233	.223	1.32	1.1	848	812
Picnic	1,680	.033	.036		.61		60	
Honeysuckle	5,320	.177	.059	.147	.41	.9	314	782
Leiberg	4,440	.016	.093	.049	.95	.6	413	217
Laverne	2,560	.045	.155	.0	.78	.0	397	0
Copper	4,000	.079	.161	.098	.12	.7	644	392
Total	33,060	.069	.094		.94		3,511	2,883
Grizzly Mountain District								
Taylors	2,800	.272 *	.485	.471	3.00	2.7	1,358	1,319
Forks-Cabin	5,440	.234 *	.369	.350	1.13	1.2	2,007	1,904
Can Creek	1,760	.156	.651	.261	2.26	1.1	1,146	459
West Fork	3,960	.118	.298	.151	1.54	.7	1,125	598
Clay Cr.	2,320	.240 *	.475	.248	1.24	.8	1,102	575
Lower Cougar	3,600	.100	.091	.104	.64	.6	328	374
Upper Cougar	3,700	.091	.179	.073	.98	.4	662	270
Bumblebee	3,040	.198	.342	.114	3.15	1.	1,040	346
Total	26,620	.174	.329		1.54		8,768	5,845
Shoshone District								
Sissons	4,700	.221	.356	.52	1.38	1.9	1,673	2,424
Yellow Dog River	2,140	.587 *	.505	1.15	1.5	3.0	1,081	2,461
Yellow Dog Cr.	4,120	.166	.246	.45	.56	1.1	1,093	1,854
Downey	4,160	.391 *	.341	.65	.97	1.8	1,419	2,704
N. Yellow Dog	840	.112	.200	.36	.67	1.2	168	302
Lower Flat Cr.	4,120	.058	.112	.0	.54	.0	461	0
Bennett Cr.	580	.0	.033	.0	.15	.0	19	0
Brett-Miner	1,550	.077	.016	.0	.26	.0	25	0
Rock City	1,600	.040	.048	.062	.35		77	99
Hawksite	8,780	.033	.075	.01	.43	.07	658	88
Cabin Cr.	7,000	.089	.129	.27	.69	.15	903	1,890
Total	39,590	.152	.191				7,577	11,822
Forks District								
Big Elk	4,960	.063	.054	.048	.25	.3	268	237
Potter Cr.	3,800	.258	.091	.032	.31	.1	346	122
Stewart	2,200	.103	.093	.058	.54	.3	205	128
Upper Flat	3,680	.022	.242	.025	1.9	.1	890	92
Total	14,640	.057	.117				1,709	579
Eagle Creek								
East Eagle	3,540	No data		.10	No data	.8	No data	354
West Eagle	1,280	" "		.08	" "	.5	" "	102
Total	4,820							456
GRAND TOTAL	118,730						21,565	21,585

* Indicates control measures.

Kaniksu National Forest, State and Privately Owned Lands

During the past decade or more severe losses of mature white pine have occurred in different portions of this area. In some units this loss has been so severe that, at present stumpage values, the residual stand does not warrant the expense of logging. Such losses are still occurring in some drainages, with a large percent of the green stand having been killed during the past few years. Rapid Lightning and Lost Creek drainages are examples of areas where severe infestations exist at the present time.

The status of the 1939 infestation within the different units of this area, as indicated by the 1939 survey, is shown in the following tabulation:

SUMMARY TABULATION OF THE 1939 INFESTATION
OF THE MOUNTAIN PINE BEETLE IN WHITE PINE
Kaniksu National Forest

Unit	Acres	Green stand per acre	Attacks per acre	Percent of stand killed	Total infested trees 1937	Total infested trees 1939
Trout Cr. T. 58 N.	2,900	4.8	None	None	597	None
Rapid Lightning Cr.						
Forest Owned	1,400	45.7	1.22	2.6	*	1,708
Privately Owned	2,560	27.2	1.34	4.7	*	3,430
Lightning Creek	15,000	15.9	None	None	225	None
Smith Creek	7,700	21.6	None	None	254	None
Caribou	6,700	12.4	.40	3.	355	2,680
Pack River	6,800	21.5	.15	.7	809	1,020
Boundary Creek	5,300	6.2	None	None	138	None
Falls Creek	5,400	1.5	None	None	0	None
Myrtle Creek	5,600	15.0	.05	.3	123	280
Ball Creek	5,200	17.1	.048	.3	666	250
Twenty Mile	1,200	17.0	.36	2.1	95	432
Upper West Branch	3,400	5.3	.046	.9	819	156
Lamb Creek	600	6.8	.0	0	0	0
Bismark	1,000	24.0	.22	.9	74	220
Goose Creek	6,900	8.4	.013	.2	110	90
Black Tail	6,600	6.7	.0	.0	759	None
Gold Creek	7,800	6.1	.08	1.3	218	624
Sullivan Creek	8,400	22.7	.19	.8	420	1,596
Lions Creek	7,200	24.4	.21	.8	1,029	1,512
Upper Priest River	7,700	10.2	.12	1.2	400	944
Two Mouth	8,500	12.8	.014	.1	170	119
Indian Creek	12,700	12.2	.085	.7	381	1,079
Hunt Creek	7,900	15.4	.16	1.0	316	1,264
Soldier Creek	9,500	11.2	.12	1.0	418	1,140
N. Fk. E. River	5,800	17.9	.25	1.4	122	1,456
Middle Fk. E. River	8,400	7.6	.03	.4	109	269
Ojibway	11,000	8.9	.02	.2	264	220
Lost Creek	1,300	14.3	.98	5.0	No data	1,275
	180,460		.124			22,465

* No comparative figure because of a difference in acreage surveyed.

Kootenai National Forest

The forests of this area are broken into a number of different types, with areas of white pine distributed throughout. Although the total volume of white pine within this area is not large, the timber is tall and of good quality.

During the past two decades the mountain pine beetle has taken a heavy toll from these scattered stands of mature white pine. During this period the loss has been materially reduced through the institution of artificial control against the most severe or "hot spot" areas of infestation. Although this effort has preserved the commercial value of these timber stands, the existing infestation constitutes a real threat to remaining white pine volumes.

The status of the mountain pine beetle situation within the white pine stands of the Kootenai National Forest, as shown by a 1938 survey, is given in the following tabulation:

SUMMARY TABULATION OF 1938 INFESTATION
OF THE MOUNTAIN PINE BEETLE IN WHITE PINE
Kootenai National Forest

Unit	Acres	Trees per acre		Percent of stand killed	Total number infested trees
		Attacked	Green		
Pete Creek	2,880	.041	8.90	.46	118
Spread Creek	1,280	.0	15.20	---	---
North Meadow Creek	800	.280	19.20	1.45	224
South Meadow Creek	600	.068	17.86	.38	40
Seventeen Mile Creek	1,000	.021	12.70	.16	21
Star Creek	2,400	.716	14.05	5.09	1,718
Ruby Creek	3,280	.065	14.10	.46	213
North Callahan Creek	1,720	.114	3.88	2.94	196
South Callahan Creek	2,000	.0	7.8	---	---
North Keeler Creek	1,840	.218	9.0	2.3	600
Lower Keeler Creek	500	.933	16.2	5.76	466
Upper Keeler Creek	4,300	.028	9.4	.29	120
Benning Creek	1,720	.421	18.7	2.2	724
Spar Lake	4,960	.149	16.8	1.37	635
West Fork of Quartz Creek	1,400	.111	11.75	.95	155
Bristow Creek	1,120	.058	21.17	.28	64
North Fork of Big Creek	640	.111	21.66	.51	71
Big Creek Roberts	1,040	---	---	---	---
Madge Creek	225	1.68	38.8	4.3	378
Camp Creek	225	.45	17.0	2.6	101
Bear Creek	2,240	.098	22.3	.44	220
Ramsey Creek	2,560	.036	18.9	.19	92
Turner	800	---	8.5	---	---
	39,530				6,156

Flathead National Forest

The few white pine areas of this forest have suffered severe losses as a result of mountain pine beetle activity during the past ten or twelve years. In the Canyon Creek drainage of the North Fork of the Flathead, it has been estimated that 80 percent of the merchantable volume was destroyed during this period. Ranger reports from the south fork of the Flathead continue to list an infestation of this insect in white pine.

Cabinet National Forest

There are a few scattered areas of white pine within the forest where some past losses have occurred. A 1939 survey of the principal areas shows that although there is a normal infestation of the mountain pine beetle it is not alarming.

STATUS OF 1939 INFESTATION
ON CABINET NATIONAL FOREST

Name of unit	Acres	Trees per acre of strip: New attacks	Trees per acre of strip: Green trees	Percent of stand killed	Number of infested trees
Camels Hump	240	0	35.4	0	0
Twelve Mile	2,000	.07	6.6	1.06	140
Big Creek	1,500	.044	23.5	.2	66

Mountain Pine Beetle in Lodgepole Pine

Although 36 reports of mountain pine beetle infestations in lodgepole pine were received from the following forests: Absaroka (2), Beaverhead (6), Bitterroot (2), Clearwater (3), Deerlodge (6), Flathead (3), Gallatin (4), Kootenai (1), Lolo (4), Nezperce (3), and St. Joe (2), there was only one situation, located on the east fork of the Bitterroot, where the infestation was considered as being above normal. Reports from the southern Idaho forests have not been received.

The history of the most recent epidemic of the mountain pine beetle within the lodgepole pine forests of Idaho and Montana is not a pleasant one to review. To summarize this story of forest destruction, it can be said that during the past twenty years an epidemic of this insect swept through the lodgepole pine stands of these states leaving the forests in a devastated condition. It is estimated that from 40 to 50 percent of the merchantable lodgepole pine of these states was destroyed during this period. In the Bitterroot, Beaverhead, Salmon, Targhee, Idaho, Sawtooth, Weiser, Nezperce, Selway, and Clearwater National Forests, where the full force of this epidemic struck, at least 80 percent of the trees above 8 inches in diameter have been killed. Due in most instances to the elimination of the host tree, there is little if any economic loss occurring on these forests at this time.

On the Cache, Caribou, and Wyoming National Forests, in southeastern Idaho, and adjacent portions of Wyoming and Utah, potentially severe infestations of the mountain pine beetle have existed for the past twelve years. During this period control measures have been directed against the "hot spots" of infestation, with success in some cases, although in other areas infestations of the mountain pine beetle in whitebark pine continued to act as a source of reinfestation to the lodgepole pine stands adjacent.

In the Teton National Forest and Grand Teton National Park, the mountain pine beetle has destroyed large volumes of lodgepole pine during the past twelve years. At the present time there is a dangerous situation on the Grand Teton National Park.

The mountain pine beetle appeared in potentially dangerous numbers within the lodgepole pine stands of the Minidoka National Forest in 1930. Although control measures were directed against some of the "hot spots" of infestation, the situation continued to increase in severity until 1936. At that time a thorough clean-up of all infested areas was made which successfully eliminated the outbreak; however, care must be exercised to prevent a recurrence of the situation.

No serious infestations of the mountain pine beetle were reported from the Gallatin, Absaroka, Deerlodge, Helena, Lewis and Clark, or Custer National Forests.

Mountain Pine Beetle in Whitebark Pine

In all whitebark pine areas of the mountain ranges contributing to the Continental Divide there have been and are still severe epidemics of the mountain pine beetle. In some areas the loss has been extremely severe, with the destruction varying from 25 to 80 percent of the trees. The duration of these outbreaks seems to be governed by the quantity of host material available.

Mountain Pine Beetle in Ponderosa Pine

There were a few infestations of this insect reported from the Bitterroot, Clearwater, Custer and Nezperce Forests. However, these situations are not regarded as alarming, or as containing any subsequent potential danger.

Western Pine Beetle (Dendroctonus brevicomis Lec.) in Ponderosa Pine

Infestations of the western pine beetle are in all ponderosa pine stands of Idaho and Montana. The loss resulting from these infestations varies from year to year, and in some instances becomes quite severe. However, in most areas the annual loss from such normal infestations will vary from a few feet to as much as 200 or more board feet per acre.

Surveys of the ponderosa pine stands of the Weiser and Salmon National Forests during the past season revealed only one small area on the Salmon Forest where the infestation warranted the institution of control. The infested trees in this area are now being treated. Although there are no serious situations within the region at this time, constant care is necessary if this condition is to be maintained.

Douglas Fir Beetle (*Dendroctonus pseudotsugae* Hopk.) in Douglas Fir

A statement to the effect that infestations of this beetle are in most all Douglas fir stands of the northern Rocky Mountains would adequately describe the status of this situation. In some areas the losses from these infestations are severe, while in others they are of negligible importance. In the southern part of Idaho, where this tree species has an immediate commercial value, infestations of the Douglas fir beetle are of economic importance. At the present time the infestation is so widespread that the thoughts of instituting control in any one area does not offer outstanding opportunities for success unless it is somewhat isolated from other infested areas. Salvage cutting operations have been directed into areas of infestation whenever possible. Reports of Douglas fir beetle infestations were received from the Absaroka (3), Flathead (4), Gallatin (2), Lolo (1), and the St. Joe National Forest (1). The situation on the Lolo Forest is reported as being serious and will be checked during the coming season.

In mixed white pine-Douglas fir stands, where the site is of low quality for the growing of white pine, the Douglas fir beetle plays a more important role than that expressed in the loss of the inferior tree species. The removal of the Douglas fir from such stands changes the normal forest environment and leaves the residual pine in a condition susceptible to the attacks of insects and disease.

Engelmann Spruce Beetle (*Dendroctonus engelmanni* Hopk.) in Engelmann Spruce

The Engelmann spruce beetle is present in all spruce stands. Losses resulting from its activity have varied in seriousness from the death of weakened and overmature trees to serious epidemics. In 1923 a serious outbreak occurred within the spruce stands along the east side of Yellowstone Lake, at which time a large volume of scenic timber was killed. No further outbreaks were recorded until 1937, when a severe epidemic occurred in the northwest corner of the Yellowstone National Park, which resulted in the death of practically all trees of that area above 8 or 10 inches in diameter. This outbreak seemed to be associated with some environmental condition which existed throughout the region, for similar epidemics, although of a much smaller magnitude, occurred on the Kootenai, Absaroka, Challis, and other areas. In most of these areas the outbreaks have subsided; however, in the Yellowstone some losses are still occurring.

The potential seriousness of these outbreaks must be appreciated and the necessary precautionary measures taken if future losses are to be prevented.

PRIMARY FOREST DEFOLIATOR INFESTATIONS

Hemlock Looper (Ellopia fiscellaria Guen.) in Alpine Fir

Prior to 1936 the hemlock looper was considered as an insect peculiar to the forests of western Oregon and Washington. During the 1936 season large numbers of adult moths were recorded, and in 1937 epidemic conditions existed throughout the forests of northern Idaho and western Montana. A total of 57 areas of severe defoliation were reported at that time and it is probable that others were not observed. Although these outbreaks were confined to areas of alpine fir, all other tree species and shrubs growing in association with this apparently preferred host for this region were severely injured. The defoliated areas, limited somewhat by the occurrence of alpine fir, varied in size from fifty or more acres to several thousand. The period of severe defoliation seemed to last for two seasons only, as the natural enemies of the insect apparently increased to such populations that the outbreaks were reduced. During the two-year period of defoliation a large percent of the defoliated trees succumbed to the injury.

Douglas Fir Tussock Moth (Henerocampa pseudotsugata McD.) in Douglas Fir

An outbreak of this insect reported from the Sawtooth National Forest as defoliating Douglas fir in 1935, subsided to a point where in 1939 no larvae could be found. During this period all trees within the infested areas, which for the most part were in young stands, died from the effects of the extremely severe defoliation.

In 1937 two species of lepidopterous parasites (Ephialtes examinator Fab. and Compsilura concinnata Meig.) were obtained from the forest insect laboratory at New Haven, Conn., and liberated in this area of defoliation. The success of this attempt to establish these beneficial insects has not been determined.

Spruce Budworm (Harmologa fumiferana Clem.)

Outbreaks of the spruce budworm, which is one of the most destructive forest defoliators of the region, were reported from the Custer, Helena, Kootenai, Lolo, and Nezperce National Forests. Some of these reports record serious defoliation and associated losses of timber. The spruce budworm has been responsible for the destruction of large areas of Douglas fir in the Yellowstone Park and within the Cody Canyon of the Shoshone National Forest.

Larch Sawfly (Nematus erichsonii Hartig.)

The first available record of this insect within the forests of the western United States came from the north fork of the Flathead River in 1934. Since that time the insect has appeared in rather localized outbreaks in the Glacier National Park and Kootenai National Forest, and at the present time is as far south as the Clark Fork River. As yet no timber losses have occurred; however, the future of the epidemic is unknown.

Two-lined Larch Sawfly (Platycampus laricis Roh. and Midd.)
Western Larch Sawfly (Platycampus laricivorus Roh. and Midd.)

These two new species of larch sawflies were first recorded from this area in 1921. Although at that time they appeared in epidemic numbers, the following season there was no evidence of their existence. The second recorded outbreak of these two defoliators occurred in 1938, near Granite, Idaho; however, normal conditions prevailed during the past summer.

Lodgepole Pine Needle Tier (Eulia pinatubana Kearf.)

Although this insect is still present in large numbers at West Yellowstone, it would seem that it causes no irrecoverable damage unless associated with the lodgepole sawfly (Neodiprion burkei Midd.). During an outbreak of these two insects at West Yellowstone, some years ago, large areas of lodgepole pine were destroyed.

White Pine Butterfly (Neophasia menapia Felder)

An outbreak of this insect was reported from the Kaniksu National Forest, where presumably it was attacking white pine. There are a number of records as to the destruction of ponderosa pine by the white pine butterfly, although we have no records of losses in white pine.

MINOR BARK BEETLE INFESTATIONS

Oregon Engraver Beetle (Ips oregoni Eichh.) in Ponderosa Pine

Small localized outbreaks of the Oregon engraver beetle continued to follow sporadic cutting of ponderosa pine in northern Idaho and western Montana. The damage resulting from these outbreaks has varied from the killing of small groups of trees to the more widespread destruction over fairly large acreages. Outbreaks of this insect develop rapidly and are equally short-lived, so that the institution of control is seldom feasible. The elimination of such timber losses is a matter of prevention rather than of controlling existing outbreaks.

Western Balsam Bark Beetle (Dryocoetes confusus Sw.)

An increasing epidemic of this beetle in alpine fir was reported from the Beaverhead National Forest and it is known to be present in many other areas. Throughout the northern Rocky Mountains there have been large numbers of this tree species destroyed by this insect.

SECONDARY FOREST INSECT INFESTATIONS

Woolly Pine Louse (Pineus pinifoliae Fitch.)

The insect is causing considerable damage in a white pine plantation on the Cabinet National Forest. Previous records show that this insect has been quite injurious to small white pine trees on the Kaniksu National Forest.

Birdseye Pine Midge (Retinodiplosis sp.)

The lateral tips of young ponderosa pine trees are killed by this insect, with considerable damage to a plantation on the Coeur d'Alene National Forest.

Pine Tip Moth (Rhyacionia sp.)

This insect was again reported from the Custer National Forest, where it is a serious enemy of ponderosa pine reproduction. Small trees are badly deformed by the destruction of the terminal buds.

Alder Flea Beetle (Altica bimarginata Say.)

This insect was reported as occurring in epidemic numbers on the Tally Lake District, Flathead National Forest.

Spruce Gall Aphid (Adelges cooleyi Gill.)

A number of forests reported the occurrence of this insect, which is a rather serious pest of ornamental shrubs.

FOREST INSECT SURVEYS - SEASON 1939

The Forest Insect Laboratory at Coeur d'Alene conducts a program of forest insect surveys to obtain data as to the status of the most important forest insect infestations. These data show the location of potentially dangerous situations and permit control measures to be instituted at a time when the grreatest benefits will be derived from a minimum expenditure. Although all forest areas need not be surveyed annually, these projects must be conducted with sufficient frequency to record the first evidence of an increasing infestation. At the present time this program has not been developed to the point where the acreage covered each year is adequate to provide the desired information, and it is obvious that until this objective is reached the actual status of bark beetle infestations in all areas will not be available.

During the 1939 season, surveys of the following areas were conducted:

FORESTS INCLUDED IN 1939 FOREST INSECT SURVEY PROGRAM

Forest	Acres	Timber Species	Insect
Coeur d'Alene	118,730	White pine	Mountain pine beetle
Kaniksu	180,460	" "	" " "
Cabinet	3,740	" "	" " "
Salmon	83,680	Ponderosa pine	Western pine beetle
Weiser	69,720	" "	" " "
Shoshone	21,461	Douglas fir	Douglas fir beetle
Glacier Nat. Park	279,000	Mixed	Mountain pine beetle Douglas fir beetle
Teton Nat. Park	4,000	Lodgepole pine	Mountain pine beetle
Total	760,791		

The acreage covered during the past season is somewhat less than the coverage of the previous three years, as shown on chart I. Due to the value of the tree species at stake, the major portion of this survey program has been directed into white pine areas. However, as will be seen from chart II, white pine covered each year falls short of the desired objective.

FOREST INSECT CONTROL PROJECTS - SEASON 1939

Control operations were instituted on the following forests during the past season:

	Time	Host and insect	Trees treated	Cost
Clearwater Forest and adjacent private lands	May and June	White pine infested with mountain pine beetle	3,031	$21,973
Kootenai National Forest	May and June	White pine infested with mountain pine beetle	1,118	$ 6,928
Coeur d'Alene National Forest	Sept. to Nov.	White pine infested with mountain pine beetle	9,056	$33,540 plus CCC labor
Shoshone National Forest	Winter 1939-40	Douglas fir infested with Douglas fir beetle	2,073	CCC labor
Grand Teton National Park	June and July	Lodgepole pine infested with mountain pine beetle	1,450	CCC labor

CHART I

COMMERCIAL TIMBER ACREAGE
IDAHO AND MONTANA

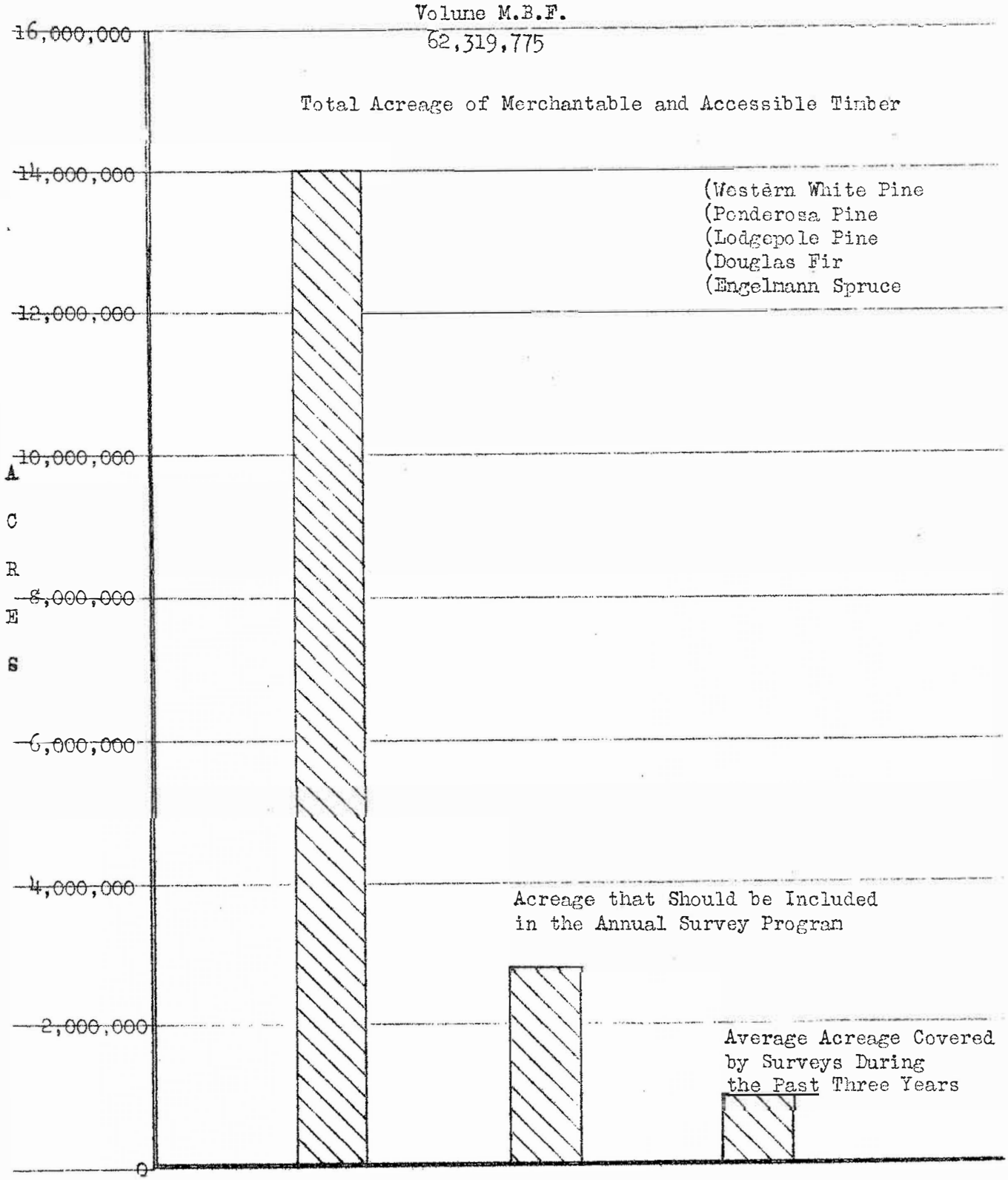

CHART II

WESTERN WHITE PINE ACREAGE
IDAHO AND MONTANA